Nationale Forschungsdaten Infrastruktur

Section

Education & Training

Training Infrastructure
Working Group Charter

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Working Group Charter Training Infrastructures

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1. Motivation

Data literacy from the very beginning! With this dictum, we firstly emphasize the importance of education in data literacy of all stakeholders in research and university teaching. Secondly, our paradigm reveals the path to sustainability of research data management (RDM). With "data literacy from the very beginning" we contribute to the advancement of scientific methods and good scientific practice: Education in data literacy enables improved formal quality of "data" as a modern resource to a degree where it can be used for both new insights and sustainable solutions to societal challenges. This is achieved by means of transparency and traceability for all stakeholders in an open or also protected data space.

2. Objectives

- Common modular and scalable training concept for the education and training of current and future FDM users (Bachelor, Master, PhD, PostDoc, PIs) taking into account a train-the-trainer concept. The aspect of modularity takes into account existing modular divisions, institutional modules and discipline-dependency of the modules.

- Teaching of data literacy and FAIR concepts at all levels (Bachelor / Master, PhD and PostDoc, PIs, industry, universities, society, training professions/technicians) both in general FDM content and discipline-specific content. The working group aims to interact with universities and federal initiatives to coordinate FDM training. The working group will take a supportive, advisory role in this process.

- Creation of a common platform for teaching materials as a knowledge base. Target group of the platform are trainers as well as end-users. The platform should be a single point of entry and link to other platforms.

- Raise awareness of FDM in the communities (change management).

- Content definition of competence parameters, on the basis of which domain-specific teaching offers can be implemented by the consortia in the following. In addition to the consortia, other stakeholders such as professional associations and learned societies will be involved in the development.

3. Description of the needs addressed by this potential service on NFDI consortia

In all consortia, good modular teaching materials are needed, e.g. for curricular teaching, workshops, Integration of RDM in hands-on experiments, autonomous learning on all levels

of expertise for all disciplines. At the moment, lots of generic material is available, but more recently emerging requirements, e.g. the adaptation of good research software development practices, are missing. Especially discipline-specific materials that describe the adaptation of the FAIR principles and Open Science concepts in community specific ways are heavily needed but lacking mostly. Some material collections do exist, but not as well-annotated learning platforms. This service will build on a semantic knowledge base being funded and developed in parallel. The target group of the platform are trainers as well as end users. The platform will be a single point of entry and refer to other platforms. The content will be defined in a set of competence parameters, on the basis of which the consortia can subsequently implement domain-specific teaching offers. In addition to the consortia, other stakeholders such as professional associations and professional societies will be involved in the development.

4. State of the art for this potential service

The research data landscape in Germany is a very diverse composition of organizational structures. In recent years, universities, universities of applied sciences, research performing organizations, initiatives as well as various citizen scientists and societies developed several platforms for training materials and teaching formats. These various offers serve different target groups (e.g. trainer, lecturer), disciplines (e.g. life science, engineering science, humanities and social sciences, natural sciences) and educational levels (e.g. PhD, Bachelor/Master students). The NFDI training infrastructure can support the exchange between these various organizational structures as well as between data producers and data consumers. Further, the NFDI training infrastructure is an important link between national efforts and international structures. Projects such as ELIXIR converge support and connect national infrastructures and initiatives on an international scale.

- https://www.fairsfair.eu/competence-centre/training-library
- https://rs.cms.hu-berlin.de/uag_fdm/pages/home.php
- https://zenodo.org/communities/dcc-rdm-training-materials/search
- DataOne Skill Building Hub: https://dataoneorg.github.io/Education/
- SSH Open Marketplace, Training materials: https://marketplace.sshopencloud.eu/search?categories=training-material&order=label
- https://dmtclearinghouse.esipfed.org/
- The Carpentries (Data Carpentry, Library Carpentry, Software Carpentry): https://carpentries.org/ (https://datacarpentry.org; https://software-carpentry.org/; https://librarycarpentry.org)
- https://schoolofdata.org/courses
- https://mantra.ed.ac.uk/
- Parthenos Standardization Survival Kit: http://ssk.huma-num.fr/#/

- https://programminghistorian.org
- http://www.getty.edu/research/tools/vocabularies/ digital humanities
- https://knowledgebase.nfdi4chem.de/knowledge_base
- TU9-FDM (2020) - FDM-Trainingsmaterial für Ingenieurwissenschaften: https://zenodo.org/communities/rdm_training_engineering_sciences
- https://elixir-europe.org/
- https://www.denbi.de/training
- FDMentor program "Train-the-Trainer": https://zenodo.org/record/5773203#.Yk1_cChByw4

5. Overall strategy for the possible service with regard to the following stages

5.1 Service initialisation strategy

In dialogue with all NFDI consortia and other relevant stakeholders and through workshops on requirements analysis, target group and needs analyses are carried out, e.g. for the different levels of competence (from students to professors) and the different areas of responsibility (researcher, data centre, libraries). By combining and comparing them, commonalities and differences are identified with regard to research methods, data types and motivators, among other things. Based on this analysis, discipline-independent target group profiles (e.g. in the form of personas) are developed and educational goals are formulated for them. With regular needs analyses, the required training offers and materials are evaluated and thus the concept as well as the materials are successively expanded in the sense of a continuous improvement process (CIP).

5.2 Service integration strategy

Training offers and materials are already available, but they are usually only known or accessible to a small circle of people (e.g. train-the-trainer concept for RDM or materials from "The Carpentries"). In this phase, such offers, which have been found in the consortia, are to be examined, made usable (in the sense of the FAIR principles) and brought together. In the process, metrics for classification are to be developed, which are based on the target group profiles and educational goals and form the basis for the modular concept. In addition to the involvement of all NFDI consortia, communication with initiatives outside the NFDI is essential in order to further disseminate their offerings and make them usable (e.g. the RDM federal state initiatives).

Modularity increases flexibility and adaptability. By making content available in a modular way, training offers can be compiled and tailored according to needs. As a basic framework for classifying modular training offers, we work with a basic offer and three deepening axes

according to (1) the method, (2) the community and (3) the level of competence. Scalability ensures applicability in a variety of training formats up to train-the-trainer concepts. The approach of the organization "The Carpentries" (with its three lesson programmes Software Carpentry, Data Carpentry and Library Carpentry) will be implemented in the concept. The section will define the overarching requirements for specific teaching and learning materials.

The aim of this phase is to develop and implement a common modular and scalable concept based on the target group profiles and educational goals. For the different target groups (e.g. data stewards, students, PhD students), the modularisation of the generic canon of competences and knowledge takes place. This procedure enables a subsequent discipline-specific design of the modules. Furthermore, handouts and good practices for the implementation of data literacy in curricula will be collected and developed.

5.3 Ramping strategy for service operation

The central element of the section is the development of a common, multidimensional teaching platform in the NFDI on data literacy. This collects and offers a comprehensive range of event formats and teaching materials on RDM and data literacy in general, covering both cross-disciplinary and disciplinary needs in a way that is appropriate for the target group. The content will be developed in close coordination and on an ongoing basis with the consortia and will be oriented towards the basic framework. In the first step, the section webpage functions as a collection of links to the knowledge bases of the consortia, the state initiatives and the UAG training/education of the DINI/nestor AG Research Data as well as other initiatives, such as the RDM Kit, FAIRsFAIR or Tess. These include slide sets for local multipliers, videos, hands-on formats, materials for on-site events, learning modules (e.g. online courses), information on conference papers, "regulars' tables", newsletters, helpdesks. In order to simplify the search for suitable materials, the knowledge base will be linked to a "query wizard" whose queries are oriented to the properties of the target group profiles and offer filter options for the metadata of the materials. In the long term, a methodological-technological solution is envisaged (with suitable funding) to present the content of the consortia FAIR in the sense of NFDI.

5.4 Datenkraftwerk - modular and scalable maker space concept for FAIR data usage and supply

Practical experiments on research data management (RDM) or maker spaces on RDM lead to a particularly lasting education in digital literacy. Therefore, such maker spaces are to be developed under the brand "Datenkraftwerk". Positive concepts from NFDI4Ing and NFDI4Chem are to be further developed into data power plants (“Datenkraftwerk”) in this work package, in which everyday research is expanded to include FAIR data usage and data supply. Over time, experiments will be set up to experience different aspects of FAIR data usage and supply. The experiments can then be integrated into academic education and further training in a modular way.

6. Initial Membership List

(At least 6 members from different institutions and at least 6 consortia)

	Name	Institution	NFDI consortia
1	Peter Pelz	TU Darmstadt	NFDI4Ing
2	Sonja Herres-Pawlis	RWTH Aachen University	NFDI4Chem
3	Johannes Liermann	JGU Mainz	NFDI4Chem
4	Florian Strauß	TU Clausthal	NFDI4Ing
5	David Ohse	Uni Bonn	PUNCH4NFDI
6	Norbert Kockmann	TU Dortmund	NFDI4Cat
7	Michael Liebau	Uni Leipzig	NFDI4Cat
8	Daniel Tschink	GFBio e.V.	NFDI4Biodiversity
9	Jens Dierkes	Uni Köln	NFDI4Health
10	Justine Vandendorpe	ZB MED	NFDI4Microbiota
11	Rabea Müller	ZB MED	NFDI4Microbiota
12	Konrad Förstner	ZB MED	NFDI4Microbiota
13	Tobias Hamann	WZL der RWTH Aachen	NFDI4Ing
14	Carsten Keßler	Hochschule Bochum	NFDI4Earth
15	Jan-Ocko Heuer	Universität Bremen	KonsortSWD
16	Daniela Hausen	RWTH Aachen University	NFDI4Chem
17	Kristin Sauerland	Helmholtz Centre for Infection Research	NFDI4Microbiota
18	Aletta Bonn	iDiv	NFDi4Biodiversity
19	Tanja Hörner	Universität Bremen / U Bremen Research Alliance	Data Train